

# Manufacturing Blitz (External)

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*Don Brown  
Provincial Specialist  
Industrial Health and Safety Program*

**Safe At Work Ontario**  
Enforcement > Compliance > Partnership >

**Ministry of Labour**

## Note:

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This presentation has been prepared to assist the workplace parties in understanding their obligations under the Occupational Health and Safety Act (OHSA) and the regulations. This document does not constitute legal advice. To determine your rights and responsibilities under OHSA, please contact your legal counsel or refer to the legislation.

## Focus

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- The manufacturing sector is diverse and complex and consists of a number of types of workplaces.
- During the months of October and November 2012 the Ministry of Labour (MOL) will be focusing on hazards in the manufacturing sector. This heightened enforcement activity is part of the MOL's Safe at Work Ontario strategy launched in June 2008.
- The primary focus of this sector-specific inspection blitz is machine guarding and lockout of machines and equipment.
- Inspectors will also check for hazards that can lead to musculoskeletal disorders (MSDs), as well as noise and chemical exposure that can lead to occupational illness. In addition they will check for any issues involving workplace violence and workplace harassment.

## Workplace Selection

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- Inspectors will focus on the following sub-sectors during this blitz:
  - automotive
  - food and beverage
  - wood and metal fabrication
  - textiles and printing
  - chemical, rubber and plastics
  - ceramics
  - logging (sawmills)
  - pulper and paper

## Guarding and Lockout Injury Stats

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- Improper or non-existent guarding and lockout of machines and equipment can result in disfiguring injuries, amputations and death.
- In the WSIB Statistical Supplement to the 2010 Annual Report the following information was reported for 2009:
  - 2,171 LTIs (lost time injury claims) for caught in or compressed by equipment
  - 427 LTIs for rubbed or abraded by friction, pressure or jarred by vibration
  - 361 amputations
- The WSIB 2010 data shows that LTIs for guarding and lockout injuries rank in the top four causes of injuries, however, the injuries tend to be more severe than any other cause of injury.

## Commonly Used Machine Guards

The following information is only intended to provide general information about different types of machine guards and is not intended to be an assessment of any specific guard in specific circumstances.

Type of Machine Guards			
Type	Method of Safeguarding	Advantages	Limitations
Fixed	Barriers that allows for stock feeding but does not permit operator to reach the danger area.	<ul style="list-style-type: none"> <li>• Can be constructed to suit many applications</li> <li>• Permanently encloses the point of operation or hazard area</li> <li>• Provides protection against machine repeat.</li> <li>• Allows simple, in-plant construction, with minimal maintenance</li> </ul>	<ul style="list-style-type: none"> <li>• Sometimes not practical for changing production runs involving different size stock or feeding methods.</li> <li>• Machine adjustment and repair often require guard removal.</li> <li>• Other means of protecting maintenance personnel often required (lockout/tagout).</li> </ul>
Adjustable	Barriers that adjust for a variety of production operations	<ul style="list-style-type: none"> <li>• Can be constructed to suit many applications</li> <li>• Can be adjusted to admit varying stock sizes.</li> </ul>	<ul style="list-style-type: none"> <li>• May require frequent maintenance or adjustment.</li> <li>• Operator may make guard ineffective.</li> </ul>

## Commonly Used Machine Guards ... continued

Type of Machine Guards			
Type	Method of Safeguarding	Advantages	Limitations
Self-Adjusting	Barriers that move according to the size of the stock entering point of operation. Guard is in place when machine is at rest and pushes away when stock enters the point of operation.	<ul style="list-style-type: none"> <li>Off-the-shelf guards are often commercially available.</li> </ul>	<ul style="list-style-type: none"> <li>Does not provide maximum protection.</li> <li>May require frequent maintenance and adjustment.</li> </ul>
Interlocking Barrier Guards	Shuts off or disengages power and prevents machine start-up when guard is open.	<ul style="list-style-type: none"> <li>Allows access to clear jams, without time-consuming removal of fixed guards.</li> </ul>	<ul style="list-style-type: none"> <li>May require periodic maintenance or adjustment.</li> <li>Movable sections cannot be used for manual feeding.</li> <li>Some designs may be easy to defeat</li> <li>Interlock control circuitry may not be used for maintenance and servicing work.</li> </ul>

## Types of Safeguarding

Type of Safeguarding Devices			
Type	Method of Safeguarding	Advantages	Limitations
Pullback Devices	Cords connected to operator's wrists and linked mechanically to the machine automatically withdraw the hands from the point of operation during the machine cycle.	<ul style="list-style-type: none"> <li>• Allows the hands to enter the point of operation for feeding and removal</li> <li>• Provides protection even in the event of mechanical repeat.</li> </ul>	<ul style="list-style-type: none"> <li>• Close supervision ensures proper use and adjustment. Must be inspected prior to each operator change or machine set-up.</li> <li>• Limits operator's movement and may obstruct their work space.</li> <li>• Operator may easily make device ineffective by not adjusting the device properly.</li> </ul>
Restraint – Sensing Devices	Interlock into the machine's control system to stop operation when the sensing field (photoelectric, radio frequency, or electromagnetic) is disturbed.	<ul style="list-style-type: none"> <li>• Adjusts to fit different stock sizes.</li> <li>• Allows access to load and unload the machine.</li> <li>• Allows access to the guarded area for maintenance and set-up activities.</li> </ul>	<ul style="list-style-type: none"> <li>• Restricted to machines that stop operating cycle before operator can reach into danger area (e.g., machines with partial revolution clutches or hydraulic machines).</li> <li>• Must be carefully maintained and adjusted.</li> <li>• Does not protect operator in the event of a mechanical failure.</li> <li>• Operator may make device ineffective.</li> </ul>

## Types of Safeguarding ... continued

Type of Safeguarding Devices			
Type	Method of Safeguarding	Advantages	Limitations
Presence-Sensing Mats	Interlock into machine's control system to stop operation when a predetermine weight is applied to the mat. A manual reset switch must be located outside the protected zone.	<ul style="list-style-type: none"> <li>• Full visibility and access to the work area</li> <li>• Install as a perimeter guard or over an entire area</li> <li>• Configure for many applications</li> </ul>	<ul style="list-style-type: none"> <li>• Restricted to machines that stop operating cycle before operator can reach into danger area (e.g., machines with part revolution clutches or hydraulic machines).</li> <li>• Some chemicals can degrade the mats.</li> <li>• Does not protect operator during mechanical failures.</li> </ul>
Two-Hand Control	Requires concurrent and continued use of both hands, preventing them from entering the danger area.	<ul style="list-style-type: none"> <li>• Operator's hands are at a predetermined safety distance</li> <li>• Operator's hands are free to pick up new parts after completion of first part of cycle</li> </ul>	<ul style="list-style-type: none"> <li>• Requires a partial cycle machine with a brake and anti-repeat feature.</li> <li>• Operator may make devices without anti-tie down ineffective.</li> <li>• Protects the operator only.</li> </ul>

## Types of Safeguarding ... continued

Type of Safeguarding Devices			
Type	Method of Safeguarding	Advantages	Limitations
Two-Hand Trip	Requires concurrent use of both hands, prevents them from being in danger area when machine cycle starts.	<ul style="list-style-type: none"> <li>• Operator's hands are at a predetermined safety distance</li> <li>• Can be adapted to multiple operations.</li> <li>• No obstructions to hand feeding.</li> </ul>	<ul style="list-style-type: none"> <li>• Operator may make devices without anti-tiedown ineffective.</li> <li>• Protects the operator only.</li> <li>• May require adjustment with tooling changes.</li> <li>• Requires anti-repeat feature.</li> </ul>

## What is a robot

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- A robot is an automatically controlled, reprogrammable multi-purpose manipulator with 3 or more axis.
- Normally 6 axis but can be more.

## Robot

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- It is the robot envelope which must be guarded not just the path.
- Robot envelopes can be reduced by mechanically limiting the range of axis.

## Guards and Protective Devices

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- Common methods of guarding robots may include:
  - Barrier
  - Light curtain
  - Safety mat
  - Area scanner
- Normally a combination of the above methods are used.

## Dough Mixer Guarding

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- Dough mixing machines need to be guarded to prevent a worker from being exposed to the moving parts.
- The guard should be interlocked so that the equipment cannot be operated when it is opened for pouring or cleaning, or when the bowl is lowered.
- An appropriate "lock-out" procedure should be in place. The interlock shall not be used in place of an appropriate lock-out procedure.

## Pre-Start Review (PSR) for Guarding

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What is a Pre-Start Review (required by section 7 of Regulation 851)?

- A Pre-Start Health and Safety Review includes, but is not limited to, a written report on the installation of a protective element or process, or modifications to an existing protective element or process. The report details the measures necessary to bring the installation or modification into compliance with the applicable provisions of Regulation 851 (Industrial Establishments) under the OHSA.

When is it required?

- A PSR would be required in a factory, when an employer
  - Installs new guarding
  - Modifies existing guarding
- The following types of guards may require a PSR:
  - A safeguarding device that signals the apparatus to stop, or
  - A barrier guard that uses an interlocking mechanical or electrical safeguarding device

## Pre-Start Review (PSR)

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- **Intent**

- To ensure that a timely professional review identifies specific hazards.
- To ensure that hazards are removed or controlled before the apparatus or process is started up.
- To ensure worker protection as required under the applicable provisions of the Regulation 851 (Industrial Establishments).
- For more information see MOL Guideline at:  
[http://www.labour.gov.on.ca/english/hs/pdf/gl\\_psr.pdf](http://www.labour.gov.on.ca/english/hs/pdf/gl_psr.pdf)

## Documents for PSR Exemption

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- In certain circumstances, a pre-start health and safety review is not required for:
  - A safeguarding device that signals the apparatus to stop, or
  - A barrier guard that uses an interlocking mechanical or electrical safeguarding device
- In order to demonstrate that a pre-start health and safety is not required, the employer must have documentation establishing that:
  - the apparatus and protective element have been manufactured or modified to meet current applicable standards (procurement/purchasing documentation verifying that the apparatus and protective element have been manufactured or modified to meet current applicable standards may be acceptable); and
  - the apparatus and protective element were installed in accordance with the manufacturer's instructions and current applicable standards, if applicable;

## Documents for PSR Exemption .... continued

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- If the protective element was not installed when the apparatus was manufactured, the following documentation is also needed to establish that a pre-start health and safety review is not required.
- the protective element is installed in accordance with the manufacturer's instruction and current applicable standards, if any (e.g. notice from the installer or certification from an accredited organization verifying that the apparatus and protective element have been manufactured or modified to meet current applicable standards may be acceptable, where such organizations exist).

## Lockout

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### What is Lockout?

- Lockout refers to specific procedures and practices to protect employees from machinery or equipment starting unexpectedly and releasing hazardous energy.

### Why is Lockout important?

If a lockout is not performed, uncontrolled energies could cause:

- Cuts, bruises, crushing, amputations, death, resulting from:
  - Entanglement with belts, chains, conveyors, rollers, shafts, impellers
  - Entrapment by bulk materials from bins silos or hoppers
  - Drowning in liquids in vats or tanks
- Burns (contact with hot parts, materials, or equipment such as furnaces)
- Fires and explosions
- Chemical exposures (gases or liquids released from pipelines)

## Blocking

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- Anyone who operates, cleans, services, adjusts or repairs machinery or equipment must be aware of the hazards associated with that machinery.
- Every year workers die or are critically injured because the equipment they are working on does not have adequate blocking installed.
- It is critical to block all forms of hazardous energy, including gravity, hydraulic pressure, or stored electrical or mechanical energy. The lack of blocking allows equipment to move or drop, striking workers, leading to fatal and critical accidents.
- Additional information can be found in:
  - MOL Alert: Equipment Blocking  
<http://www.labour.gov.on.ca/english/hs/pubs/alerts/a23.php>

## Roles and Responsibilities to protect worker from machine hazards

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- Employers, supervisors and workers have responsibilities under the *Occupational Health and Safety Act* (OHSA) and the Regulation for Industrial Establishments (R.R.O. 1990, Reg. 851). Some of the responsibilities may include:

### **Employers must:**

- Provide appropriate information, instruction and supervision to protect workers (OHSA, clause 25(2)(a)) (i.e. training in lock-out and guarding procedures).
- Ensure that the equipment provided is maintained in good condition (OHSA, clause 25 (1) (b)) (i.e. by replacing/ repairing damaged components of a machine)
- Determine whether a Pre-Start Health and Safety Review must be conducted on newly installed machinery (Reg. 851, section 7)

## Roles and Responsibilities to protect worker from machine hazards

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### Employers must:

- Ensure appropriate guarding:
  - When a hazard exists from a exposed moving part that may endanger a worker it is required to be guarded by a guard or other device that prevents access to the moving part (Reg. 851, section 24)
  - Any machine that has an in-running nip hazard that may endanger a worker must be equipped with a guard or other device to prevent access to the pinch point (Reg. 851, section 25)
- Ensure appropriate lockout and blocking procedures:
  - A machine should only be cleaned, oiled, adjusted, repaired or have maintenance on it when motion that could endanger the worker is stopped and any stopped part that could move has been blocked (Reg. 851, section 75)
  - Where the starting of a machine may endanger a worker, lock out control switches or other control mechanisms, and take other effective precautions to prevent any starting (Reg. 851, section 76)

## Roles and Responsibilities to protect worker from machine hazards

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### Supervisors must:

- Take every reasonable precaution in the circumstances for the protection of workers [27(2)(c) of OHSA]
- Ensure workers comply with the OHSA and its regulations [27(1)(a) of OHSA]
- Ensure workers use any equipment, protective devices or clothing required by the employer [27(1)(b) of OHSA]
- Advise workers of any potential or actual health and safety dangers [27(2)(a) of OHSA]

### Workers must:

- Participate in training including lockout and guarding [28(1)(a) of OHSA]
- Follow lock-out and guarding procedures [28(1)(a) of OHSA]
- Report machine hazards and other workplace hazards to their supervisor [28(1)(d) of OHSA]
- Use or operate machinery in a safe manner [28(2)(b) of OHSA]

# Energy forms, energy sources, and lockout considerations

The following information is only intended to provide general information about different types of energy forms and is not intended to be an assessment of any specific lockout circumstances.

Energy Form	Energy Source	Lockout Considerations
Hydraulic Energy	hydraulic systems (e.g., hydraulic presses, rams, cylinders, hammers)	shut off, lock (with chains, built-in lockout devices, or lockout attachments) and tag valves; bleed off and blank lines as necessary.
Pneumatic Energy	pneumatic systems (e.g., lines, pressure reservoirs, accumulators, air surge tanks, rams, cylinders)	shut off, lock (with chains, built-in lockout devices, or lockout attachments) and tag valves; bleed off excess air; if pressure cannot be relieved, block any possible movement of machinery.
<b>Kinetic Energy</b> (energy of a moving object or materials moving object may be powered or coasting)	blades; flywheels; materials in supply lines of bins or silos	stop and block machine parts (e.g., stop flywheels and ensure that they do not recycle); review entire cycle of mechanical motion, ensure that all motions are stopped. block material from moving into area of work; blank as required.
<b>Potential Energy</b> (stored energy that an object has the potential to release due to its position)	springs (e.g., in air brake cylinders); actuators; counterweights; raised loads; top or movable part of a press or lifting device	if possible, lower all suspended parts and loads to the lowers (rest) position, block parts that might be moved by gravity; release or block spring energy.
Thermal Energy	supply lines; storage tanks and vessels	shut off, lock (with chains, built-in lockout devices, or lockout attachments) and tag valves; bleed off excess liquids or gases; blank lines as necessary.

## Musculoskeletal Disorder (MSD) Prevention

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- The ergonomics portion of the Manufacturing Blitz will focus on potential MSD hazards associated with activities that may be in an industrial establishment. Employers should address the following MSD hazards:
  - 1. Loading and Retrieving Items into/from a Machine**
    - MSD hazards that can be associated with loading or retrieving items into/from a machine can include repetition, force, awkward or sustained postures, prolonged standing, or prolonged sitting.
  - 2. Guarding Ergonomics**
    - If a guard has been installed, has ergonomics been considered? There are many situations in which installing a guard can introduce MSD hazards into the process.
    - More information on MSD and Ergonomics is available on the MOL website at: <http://www.labour.gov.on.ca/english/hs/topics/pains.php>

## Occupational Illness - Chemicals

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- What is Occupational Illness?
  - A condition that results from a worker being exposed to a physical, chemical or biological agent to the extent that the normal physiological mechanisms are affected and the health of the worker is impaired. It includes an occupational disease for which a worker is entitled to benefits under the [Workplace Safety and Insurance Act, 1997](#)
  - The following WSIB occupational disease fact sheets explain how we identify and prevent occupational diseases
    - Avoiding Occupational disease  
<http://www.wsib.on.ca/en/community/WSIB/230/ArticleDetail/24338?vgnextoid=7da84c23529d7210VgnVCM100000449c710aRCRD>
    - MOL Occupational Illness and Health Hazards website  
[http://www.labour.gov.on.ca/english/hs/topics/health\\_hazards.php](http://www.labour.gov.on.ca/english/hs/topics/health_hazards.php)

## Occupational Illness – Chemicals ... continued

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- Fact sheets for Occupational disease

<http://www.wsib.on.ca/en/community/WSIB/230/ArticleDetail/24338?vnextoid=2f432ac8e5ed7210VgnVCM100000449c710aRCRD#ODP>

- Chemical agents

- Includes such things as acids, solvents, ammonia, metal working fluids, heavy metals, silica dust, carbon monoxide, and pesticides.
- Exposure to chemical agents may result in poisoning, lung disease and work-related asthma, skin rashes and other organ damage or disease depending on the agent.

## Occupational Illness - Noise

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- Noise is a serious hazard in many workplaces. Over time, if exposure to noise from machinery, processes, and equipment is not properly eliminated or controlled, it may cause permanent hearing loss in workers.
- Exposure to high levels of noise in the workplace, may also create physical and psychological stress, reduce productivity, interfere with communications, and contribute to accidents and injuries by making it difficult to hear moving equipment, other workers, and warning signals

## Controlling Noise Exposure

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- Section 139 of Regulation 851 sets out requirements to ensure that the hazards associated with the exposure of workers to noise are eliminated or properly controlled.
- The 3 key requirements of this section may be summarised as follows:
  - a) Employers to take all measures reasonably necessary in the circumstances to protect workers from exposure to hazardous sound levels that result in the  $L_{ex,8}$  exposure limit of 85 dBA being exceeded (8-hour time-weighted average exposure)
  - b) When the exposure limit prescribed by Regulation 851 is exceeded, the employer is required to put in place measures to reduce workers' exposure. Protective measures may include:
    - engineering controls to reduce noise at the source or along the path of transmission;
    - work practices such as equipment maintenance (to keep it quieter), or scheduling to limit a worker's exposure time; and
    - personal protective equipment in the form of hearing protection devices, subject to the restrictions stated in the regulations
  - c) Employers must post clearly visible warning signs at the approaches to areas where the sound level regularly exceeds 85 dBA.

## Workplace Violence

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- The applicable sections of the Occupational Health and Safety Act include:
  - **Workplace Violence Policy**
    - 32.0.1 (1) An employer shall,
      - a) Prepare a policy with respect to workplace violence;
      - c) Review the policies as often as is necessary, but at least annually.
  - **Written Form, posting**
    - (2) The policies shall be in written form and shall be posted at a conspicuous place in the workplace.
    - (3) Subsection (2) does not apply if the number of employees regularly employed at the workplace is five or fewer, unless an inspector orders otherwise.
  - **Workplace Violence Program**
    - 32.0.6 (1) An employer shall develop and maintain a program to implement the policy with respect to workplace violence required under clause 32.0.1 (1) (a)
  - **Information**
    - 32.0.5 (2) An employer shall provide a worker with,
      - a) Information and instruction that is appropriate for the worker on the contents of the policy and program with respect to workplace violence;

## Workplace Harassment

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- The applicable sections of the Occupational Health and Safety Act include:
  - **Workplace Harassment Policy**
    - 32.0.1 (1) An employer shall,
      - a) Prepare a policy with respect to workplace harassment; and
      - c) Review the policies as often as is necessary, but at least annually.
  - **Written Form, posting**
    - (2) The policies shall be in written form and shall be posted at a conspicuous place in the workplace.
    - (3) Subsection (2) does not apply if the number of employees regularly employed at the workplace is five or fewer, unless an inspector orders otherwise.
  - **Workplace Harassment Program**
    - 32.0.6 (1) An employer shall develop and maintain a program to implement the policy with respect to workplace harassment required under clause 32.0.1 (1) (b)
  - **Information and instruction, harassment**
    - 32.0.7 An employer shall provide a worker with,
      - a) Information and instruction that is appropriate for the worker on the contents of the policy and program with respect to workplace harassment;

## Additional MOL Resources

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- For additional information regarding OHS requirements related to noise exposure and workplace violence/workplace harassment, the MOL has created the following guidelines for workplace parties:
- **Occupational Noise:**  
<http://www.labour.gov.on.ca/english/hs/pubs/noise/index.php>
- **Workplace Violence/Workplace Harassment:**  
<http://www.labour.gov.on.ca/english/hs/pubs/wpvh/index.php>

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# Thank You